# 8. Lina

**Program Name: Lina.java**          **Input File: lina.dat**

You and Lina have a Binary Search Tree project due tomorrow, but you haven't started! Quick, write a program to take in a list of strings, make a binary search tree based on that list, and find the diameter, width, height, and number of leaves in the tree. The definitions of these terms are as follows:
- Diameter – The length (number of connections) of the longest path between 2 nodes in the binary search tree.
- Width – The number of nodes in the largest layer of the tree (which level has the most nodes, how many nodes).
- Height – The length (number of connections) of the path from the root of the tree to the lowest node.
- Number of leaves – Leaves are nodes in the tree with no children, find out how many there are.

Duplicate values should be treated as less than and sent to the left subtree.

**Input:** The input will begin with an integer, $n$ ($0 < n <= 1000$), denoting the number of test cases to follow. Each test case will consist of a list of space separated strings of unknown length to be put into the binary search tree. Put the strings into the tree in the order they are given. These strings will not contain any punctuation.

**Output:** First output the string "TEST CASE #n:", where n is replaced with the number of the test case, starting at 1. Then, on the following line, output the string "DIAMETER OF THE TREE: ", followed by the integer diameter of the created binary tree. Then, on the following line, output the string "WIDTH OF THE TREE: ", followed by the integer width of the created binary tree. Then, on the following line, output the string "HEIGHT OF THE TREE: ", followed by the integer height of the created binary tree. Then, on the following line, output the string "NUMBER OF LEAVES IN THE TREE: ", followed by the integer number of leaves in the created binary tree.

**Sample input:**
```
3
Hello Its Me
I Was Wondering If After All These Years Youd Like To Meet
Somebody Once Told Me The World Was Macaroni
```

**Sample output:**
```
TEST CASE #1:
DIAMETER OF THE TREE: 2
WIDTH OF THE TREE: 1
HEIGHT OF THE TREE: 2
NUMBER OF LEAVES IN THE TREE: 1
TEST CASE #2:
DIAMETER OF THE TREE: 7
WIDTH OF THE TREE: 3
HEIGHT OF THE TREE: 5
NUMBER OF LEAVES IN THE TREE: 4
TEST CASE #3:
DIAMETER OF THE TREE: 6
WIDTH OF THE TREE: 3
HEIGHT OF THE TREE: 3
NUMBER OF LEAVES IN THE TREE: 3
```